

DEPARTMENT OF INFORMATION TECHNOLOGY

GE606-PROFESSIONAL ETHICS IN ENGINEERING

SEM/YEAR-08/04

UNIT I

ENGINEERING ETHICS

1.What is Engineering Ethics?

- The systematic study of the rules and ideals of the Engineering Profession
- Engineering ethics is important to good engineering practice as Mathematics, etc.

2.What are the codes of Engineering Ethics.

- Early Codes:
 - Codes of personal Behaviour
 - Codes of honesty in business dealings and fair business dealings and fair business product.
- Newer Codes
 - Responsibility to public Interest
 - Personal Ethics in workplace.
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3.What are the objectives of Engineering Ethics.

- The study of the characteristics of morals.
- The study of the moral choices made by each person in his or her relationship with other persons.

4. What is morality?

The term morality concerns with

(a) what ought or ought not to be done in a given situation, (b) what is right or wrong in handling it, (c) what is good or bad about the persons, policies and principles involved in it.

5. What are the approaches of Engineering Ethics?

(1) **MICRO-ETHICS:** This approach stresses more on some typical and everyday problems which play an important role in the field of engineering and in the profession of an engineer.

(ii) **MACRO-ETHICS:** This approach deals with all the societal problems which are unknown and suddenly burst out on a regional or national level.

6.What is inquiry and what are the types of inquiry?

Inquiry means an investigation. Like general ethics, Engineering ethics also involves investigations into values, meaning and facts. These inquiries in the field of Engineering ethics are of three types.

1. Normative Inquiries
2. Conceptual Inquiries
3. Factual or Descriptive Inquiries

7.What is moral Dilemma?

Dilemmas are certain kind of situations in which a difficult choice has to be made. Moral dilemmas can also be called moral problems. Moral Dilemmas have two or more foldings - moral obligations, duties, rights, goods, or ideals come disagreement with each other.

8. What is moral Autonomy?

Autonomy means self— governing or self— determining i.e., acting independently. Moral autonomy means the right or the wrong conduct which is independent on ethical issues. It deals with the improvement of an individual's moral thoughts which make him to adapt good habits.

9. What are the levels of moral Development?

There are three levels of moral Development.

- The Preconventional Level
- The conventional Level
- The Post conventional Level

10. Define Consensus and Controversy?

Consensus means 'agreement' and 'controversy' means disagreement. The consensus and the controversies are playing the vital roles while considering the moral autonomy.

11. What is Profession and Professional.

The word 'Professional' gets different meanings based on the context. In general 'Professional' relates to any work that a person does for an occupation, especially work which requires a special skill or training.

“ Profession” means a type of job that requires special training and that brings a fairly high status.

12. What are the criteria for achievement of professionalism.

- Knowledge
- Organization
- Public Good

13. What are the model of Professional Roles?

(1) Savior

The engineers are responsible for creating an utopian society in which everything is possible.

(2) Guardian

Engineers only know the directions through which technology will be developed.

(3) Bureaucratic Servant

Engineers' role in the management is to be the servant who receives and translates the directive of management into better achievements.

(4) Social servant

The role of engineers is not only providing service to others but also their responsibility to the society.

(5) Social enabler and catalyst

The engineer has to play a role of creating a better society and should be the cause of making social changes.

14. Define Integrity?

Moral integrity is nothing but the unity on the basis of moral concern and honesty. Integrity is the unity between responsibility of an individual in his personal and professional life.

15. Write the uses of Ethical Theories?

1. Understanding moral dilemmas.
2. Justifying professional obligations and ideas and
3. Relating ordinary and professional morality

16. What are the senses of responsibility?

- (a) A virtue as a characteristic quality
- (b) Obligations
- (c) General Moral capacities of people
- (d) Liabilities and accountability for actions
- (e) Blameworthiness or Praise worthiness

17. What are the theories responsible for morality or right action?

- Virtue Ethics
- Utilitarianism
- Duty Ethics
- Right Ethics

18. What is self Interest?

Self Interest is nothing but one's personal good. It refers to the goodness of oneself in the long run.

19. What is ethical Egoism?

Ethical Egoism is which challenges all the ethical Theories and it tries to reduce morality to the pursuit of self interest.

20. Difference Between Ethics and Engineering Ethics.

Ethics	Engineering Ethics
It is an activity which concerns with making investigation and knowing about moral Values.	It also aims at knowing moral values related to engineering and finding accurate solution.
It is a means of embracing moral Questions from non moral problems.	It gives a total view of the moral problems and the way to solve related to that field.

UNIT-II ENGINEERING AS SOCIAL EXPERIMENTATION

1. What are the main aspects that are virtual for combining Engineering works to make it suitable as Experiments?

- Any Engineering project or plan is put into practice with partial ignorance because while designing a model there are several uncertainties.
- The final outcomes of Engineering projects are generally uncertain like that of experiments that we do.
- Good and effective engineering depends upon the knowledge possessed about the products at the initial and end stages.

2. What is Engineering Experimentation?

Engineering Experimentation is decided to change a new Engineering concept into its first rough design, preliminary test or simulation should be conducted. These test may be based on more detailed designs.

3. Name three conditions that are essential for a valid informed consent?

- The consent is given voluntarily
- The consent is based on information a rational person would want, together with any other information requested and presented to them in understandable form.
- The consenter was competent to process the information and make rational decisions.

4. What are the roles of codes?

Inspiration and Guidance
Support
Deterrence and Discipline
Education and Mutual Understanding
Contributing to Professions Public Image
Protecting Status Quo
Promoting Business Interest.

5. What is codes of Ethics?

The codes exhibit the rights, duties and obligations of the members of a profession. Codes are the set of laws and standards. A code of ethics provides a framework for ethical judgement for a professional. A code defines the roles and responsibilities of

professionals.

6. What are the limitations of codes?

1. They cannot serve as the final moral authority for professional conduct..
2. Engineering codes often have internal conflicts.
3. Codes can be reproduced in a very rapid manner.
4. Codes are said to be coercive.

7. What are the types of Industrial Standards?

Quality
Quality related to service.
Safety
Acceptance in procedures for usage
Physical properties and functions.

8. What is meant by control group?

Members are in two different groups. Members of one group receive special experimental treatment. The other group members, called 'control group'.

9. What is meant by informed consent?

When new medicines are tested it should be informed to the person who undergo the test. They have moral and legal rights to know about the fact which is based on informed consent before they take part in the experiment.

10. What are the responsibilities for engineers to serving the society?

1. A primary duty is to protect the safety of human beings and respect their right of consent.
2. A comprehensive perspective of relevant information.
3. Unrestricted free personal involvement in all steps of a project.
4. Being accountable for the results of a project.

11. What are the uncertainties occur in the model design?

- Model used for the design calculations.
- Exact characteristics of the material purchased.
- Constancies of materials used for processing and fabrication.

12.What is meant by accountability?

The people who feel their responsibility always accept moral responsibilities for their action.It is known as accountable.It means being culpable and hold responsible for faults.

13. What is meant by relevant Information?

Relevant Information is for showing moral concern there should be an obligation to obtain and access properly all the available information related to fulfillment of one's moral obligation.

14.How do codes support engineers?

Codes support an Engineer who follows the ethical principles. Codes give engineers a positive, a possible good support for standing on moral issues.

15.Name some Engineering societies that published codes of Ethics?

AAES-American Association of Engineering society.

ABET-Accreditation Board for Engineering and Technology

IEEE-Institute for Electrical and Electronics Engineering

16.What is balanced outlook on Law?

A balanced outlook on laws stresses the necessity of laws and regulations and their limitations in directing engineering practice.

17.What are the suggestions given by the safety Engineers?

- Exact rules and regulations are suitable in case of ethical misconduct.
- The rules should not try to cover all possible outcomes of experiment and not force the engineer to follow strictly.
- The rules and regulation should be broad.

18.What are the reasons led to many repetition of past mistakes?

- Lack of established channels of communication.
- Misplaced pride in not asking for information
- Embarrassment at failure or fear of litigation.
- Negligence.

19.How do the codes of ethics provide discipline among the engineers?

Codes help to investigate unethical conduct.The investigation on the basis of codes does not overrule the rights of those being investigated.

20. What are the obligations of researchers?

1. To do no harm to the community.
2. To involve the community in active participation rather than passive acceptance.
3. To ensure the design, implementation, analysis, interpretation, reporting, publication and distribution of the research are culturally relevant to the community and in agreement with the standards of competent research.

UNIT III

ENGINEER'S RESPONSIBILITY FOR SAFETY

1. What is safety?

A thing is safe if its risks are justified to be acceptable. Designer's thing is said to be safe if for the person who judges the perceived risk is less.

2. Define Risk?

Risk is defined as the probability of a specified level of hazardous consequences being realized. Risk is thus a product of probability (P) and consequence (C) which is given by the equation $R = P \times C$.

3. What are the techniques that are available for reducing risk?

- Use of diversity and redundancy principles in instrumented protection systems
- Regular inspection and testing of safety systems to ensure reliability.
- Training of operating personnel and regular audits to ensure workability of the systems and procedures
- Development of a well considered emergency plan together with regular drills to ensure preparedness.

4. What are the principles of strict Liability?

- Consider the importance of chances of defects that are causing injury against the cost of minimizing defects.
- The following and implementing the accepted practices and observing standards are not sufficient.
- Standards and practices are simply the checklists. so the engineers have to use them creatively and judgementslly.

5. List out the analytical methods used when testing is inappropriate?

- Scenerio Analysis.
- Failure models and Effect Analysis
- Fault Tree Analysis
- Event Tree Analysis.

6. Define Risk Benefit Analysis?

Risk-benefit analysis is a method that helps the engineers to analyze the risk in a project and to determine whether a project should be implemented or not.

7. Define Prototype Testing?

It is the testing of a product carried out to destruction. This type of testing will be carried out after real accidents occur. It is also known as destructive testing.

8. What are the uncertainties in design?

- Purpose of designing
- Application of the product
- Material and skill used for producing the product.

9. What are the three conditions for safe exit?

- When a product fails, it will fail safely.
- The product can be abandoned safely.
- The user can safely escape the product.

10. Write the problems faced by the Engineers regarding the public conceptions of safety?

- i. Optimistic Attitude
- ii. Pessimistic Attitude

11. What is overestimation of Risk?

A product whose risks are comparatively less may be considered unsafe because of extraordinary safety concern of a person.

Eg: Judging fluoride in water can kill a lot of people.

12. Give any two examples for safe Exit?

- Ships need lifeboats with sufficient spaces for all passengers and crew members.
- Buildings particularly multistoreyed need usable fire escapes.

13. Define strict Liability?

It means if the sold product is defective, the manufacturer concerned is liable for any harm to users.

14. What are the available quantitative measures in overcoming difficulty in accessing personal risk?

- Assessing voluntary activities.
- Assessing dangerous/ risky job works can demand for increased wages to carry out the job.

15. How scenario analysis done?

In this analysis while testing the safety of a product, a person has to start from a given point and then study all the different consequences developed gradually from it.

16. What are the factors influenced in acceptability of risk?

- Voluntarism and control.
- Effect of information on risk assessment.
- Job related Pressures.
- Magnitude and Proximity

17. Define Disaster?

Disaster is defined as a series of continued event and a state of unpreparedness.

18. What are the drawbacks that are involved in the definition of Lawrence on safety?

- Under Estimation of Risks.
- Over Estimation of Risks
- No Estimation of Risks.

19. Define acceptability of risks?

A risk is acceptable when those affected are generally no longer (or not) apprehensive about it. Doubtfulness depends mainly on how the people take the risk or how people perceive it.

20. What are the reasons for the inadequacies in knowledge of risks?

- The information is not freely shared among industries.

- There are also new applications of old technologies that provide available data which are less useful.

UNIT IV

RESPONSIBILITIES AND RIGHTS

1. What is meant by collegiality?

Collegiality is the tendency to support and co-operate with the colleagues collegiality is an essential and excellent characteristic needed for an engineer.

2. What is meant by connectedness?

Connectedness is an awareness of being a part of a co-operate undertaking that is created by shared commitment and expertise. It also mean that being united with after engineers results in co-operation and keeping mutual understanding with proper support among engineers.

3 .What is meant by expert authority?

Expert authority is the possession of special knowledge ,skill or competenceto perform a given job in a better way or to give beneficial advice regarding a job for example ,doctors are the authorities on health.

4. Is institutional authority morally justified? when?

An Employer may have the institutional authority to direct engineers to do something that is not morally justified. The Engineers may have the institutional duty to obey employer to do morally unjustified things.

5 .Give three arguments in favors of unions in collective bargaining?

- Unions give job security and protection against random treatment to the employees.
- Employees' union can also resist the orders to perform unethical acts.
- Unions help to provide a most effective and good grievance procedure for the complaints of employees, so that, stability can be maintained.

6.Why should engineering information kept confidential?

Most of the information can directly affect the company's ability to compete in the market place such as how a business is turning out its products, its customers and suppliers. These information may be used by a competitor to capture the market. So, such kind of information should be kept confidential in the good interest of the company to the possible extent.

7. What does respect for promises between the employer and employee refer?

Respect for promises refers to giving respect for the promises between the employer and the employees. Employees should not disclose the promises which are made with their employer.. Promises do not establish complete obligations.

8. What are the different ethical theories which help to justify the rights?

There are different ethical theories which help to justify the rights in different ways. They are:

- (i) Right-based theories
- (ii) Duty-based theories
- (iii) Utilitarian theories.

9. What are the possible way of avoiding the conflicts of interest ?

- A best way is to follow the guidance from a company's policy.
- In the absence of such policy, taking a second opinion from a subordinate or co-worker or even the manager. This gives an impression that there is no intention on the part of the person to hide anything.
- In the absence of the above two ways, it is better to examine one's own motives and use ethical problem solving techniques.

10. What meant by occupational crime?

Occupational crimes are the illegal acts that are made possible through a person's lawful employment. It is a secret violation of laws which rules the work activities.

11. Explain the conflict and crime in 'price-fixing' with example?

The price fixing was not consider the activities as crime. Many of them argued that their conduct was beneficial. This crime of price fixing had been spread over the industries for a long period of time.

12. What is meant by contractual employee rights and non contractual employee right. Give example?

Contractual Employee Rights:

Employee rights also have the institutional rights which arise safely out of an employee's contracts created by organizational policies or contracts.

Example: rights to receive a salary of a certain amount.

Non contractual employee rights:

These are the rights that occur even if not formally recognized in the specific contracts or company policies.

13. What is the limitation imposed by the employers on the employees right of choice engagement of outside activities?

- When the outside activities of employees form a conflict of interest, then employers have the right to take action against the employees. For example, stop an employee from moon lighting.
- Employees have no right to damage their employer's interest outside the office-hours.

14. What are the main element of intellectual property right ?

- 1) Patents for inventions
- 2) Copyrights for material
- 3) Trademarks for broad identity and
- 4) Trade secrets.

15. What is meant by copy right?

A copyright is a very specific and exclusive right even for reproduction of an original work. This is for material, literary, aesthetic material, music, film, sound recording, broad casting, software and multimedia. This provides automatic right for protecting any original creation, which is not in need of registration but with limited time.

16. What is meant by preferential treatment?

Preferential treatment means giving preference for the minorities and women in employment opportunities.

- i. Weak Preferential Treatment
- ii. Strong Preferential Treatment

17. What is known as a “trade secret” ?

Trade Secret means information which is kept confidential as a secret. This is generally not known in the relevant industry providing an advantage to its owner over other competitors.

18. What are basic type of moral rights engineers should have in addition to their responsibility?

There are two types of moral rights, They are

- Human rights
- Professional rights

Human rights:

There should be possessed by engineers by virtue of being people.

Professional Rights:

These rights are possessed by virtue of being professionals.

19. What does the theory is ‘duty ethics ‘stress in placing order to the employee?

Duty ethics holds the view that rights are not the final moral appeal. The employers have a duty not to harm the public by placing barriers in the works of the engineers who try to meet their obligations to the public.

20. What is meant by bootlegging?

Bootlegging is making transferring or selling out something which is illegal. In Engineering, it refers to working on projects not properly authorized.

UNIT V

GLOBAL ISSUES

1. Define Multinational Corporation with Example?

When a company operates its business in several countries, it is known as a multinational corporation. For example, Smithkline Beecham, Hindustan lever Ltd., Ford, Toyota etc. are multinational corporations.

2. What is meant by Relative Values in multinational Corporation issues?

Relative values mean relative principles. These relative values help in deciding how the multinational corporations and individuals have to act in foreign or host countries.

3. What are the different forms of relativism in existence of the formation of a multinational corporation?

The following three forms are important

- Ethical Relativism
- Descriptive Relativism
- Moral Relativism or Contextualism.

4. What is known as technology transfer?

Technology Transfer is a process of changing the technology to a new setting and implementing it. Technology includes hardware such as machines and installations as well as techniques such as technical, organizational and managerial skills and procedures.

5. What is meant by appropriate technology?

Appropriate technology means identification, transformation and implementation of the most suitable technology for a new set of conditions.

6. What are the general effects of Acid rain?

- Bacterias that are essential for life systems to be active are killed.
- High acidity results in reduced growth and killing of fishes.

- Accumulation of organic matter in lake and streams increases the degree of water pollution.
- Concentration of heavy particles like copper, zinc, lead, and manganese are increased in water.

7. What are the ethical issues or questions that arise in environmental protection?

The questions that arise in this sort of ethical issues are:

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Who is affecting? Who are affected? Does the environment get disturbed? When does the disturbance take place? And how does it happen?

8. What does the Right Ethics stress for a livable environment?

Right ethics' stresses that the fundamental right to life enforces a right for livable environment in a particular period of time, when pollution and depletion of resources has reached a dangerous proportion.

9. What are the different categories of problems that exist in computer ethics?

There are basically three categories of problems in computer ethics.

- Computer happened to be the instrument of an unethical act.
- Computer is the object of an unethical act. This act is properly known as hacking.
- Problems connected with autonomous nature of computer.

10. How are the computer ethics problems classified?

- When computers are used for unlawful activities, it makes it easier to steal from a variety of the people. For e.g.: Computers can be used to steal from an employer, an outsider can get into a system, a company can use the computer to steal from its clients and customers.
- Computer leads to the elimination of some jobs.
- Computers create problems of public accountability of business which use computer based services.

11. What are the professional issues in computer Ethics?

- Computer Failures
- Computer Implementation
- Health Condition

12. What are the principles for conflict resolution?

- People must be separated from the problem.
- Focus must be only on interest and not on positions.
- Various options must be generated.
- An evolution criteria should be established.

13. What are the abuses of Engineers as expert witnesses?

- Hired Guns
- Financial Prejudices or Financial Influences
- Sympathy Biases.

14. What are the normative models for advisors?

The normative models for advisors are:

- a)HiredGuns
- b)Value-NeutralAnalysts
- c) Value-Guided Advocates.

15.What is meant by moral Leadership?

Leadership points out the success in leading a group of persons towards the achievement of goals and objectives. Whenever the goals of a leader become permissible and also morally valuable, it is known as moral leadership.

16.What are the rules of practice framed in the codes of Ethics?

- Engineers shall perform services only in the areas of their competence.
- Engineers shall issue public statements only in an objective and truthful manner.
- Engineers shall act in professional matters for each employer or client as faithful agents or trustees.

17. What are the Professional Obligations in codes of Ethics?

- Engineers shall be guided in all their professional relations by the highest standards of integrity.
- Engineers shall at all times strive to serve the public interest.
- Engineers shall avoid all conduct or practice which is likely to discredit the profession or deceive the public.

18.What is Ego Biases?

Many of the adversarial circumstances establish some competitive attitudes among engineers who acts as expert witness.

19.List some of the environmental issues of concern to engineers?

- Releasing harmful substance into water and air
- Using toxic substance in food processing
- Disturbing land and water balances

20. What are the international Rights?

The following are some important international rights:

- Freedom of physical movement of people
- Ownership of properties
- Freedom from Torture.
- Fair Trial on the products.